EPA comments on BDCP Effects Analysis Appendix C (June 5, 2012)

Note: There is so much material associated with Appendix C that we may have missed explanations that would have addressed some of these concerns. We trust the authors to identify which of the following concerns are justified and which are addressed in material that we missed.

Models used

The scope of the preliminary proposal requires the use of an array of models to estimate its impacts, as the authors use here. It would be useful to clarify how the models are used. In particular, models that are published and peer-reviewed are used side-by-side with models which seem to largely be described only in BDCP documents. And, in the conclusions, reference is made to the UnTRIM model as a tool used to assess some changes amongst scenarios, but the UnTRIM model is not included in the list of models, nor is its application described.

The use of 'professional judgment' is referenced amongst the tools used, but there is no description of the professionals consulted or where the professional judgment tool was applied. CalFed, IEP, and various other groups have drawn upon professional judgment in various contexts in recent years and some good processes have been used to apply such judgments in a transparent way. We recommend identifying the when professional judgment is used and naming the professionals consulted.

Many conclusions about delta salmon passage are based upon the Delta Passage model. The uncertainty of its results, because it has not been published, should be highlighted. This is a decision point where the professional judgment of scientists doing related field work could be combined with this modeling effort to provide more support for conclusions.

Model results

CALSIM's monthly time-step is poorly reflective of the high flow events targeted by the Proposed Project. If those high flow events are not large or long enough to raise the monthly average, the likely use of the new facilities may be substantially underestimated. This is addressed to some extent by calibrating the targeted monthly average historical data of daily measures vs. monthly averages. Estimating the error of this method by calculating the size of confidence limits around the reported averages would approximate the magnitude of under or over estimation. This information can then be used to evaluate potential impacts such as the range in number of days when fish would be exposed to operations.

The description of CALSIM indicates that the reservoir operation rules included the option to release more water for delta diversions, the conclusions and results suggest very minimal changes in upstream operations. After a short storm, might reservoir releases augment flows to keep bypass flows adequate to allow use of the north delta facilities? The monthly time step may not be sensitive enough to capture this operational strategy. Such things should be vetted with operators and assessed for how well the model reflects likely day-t o-day operations.

Delta smelt habitat calculations are unclear. There seems to be no report of the effects of flow changes

on habitat under the present geometry but only of amounts of habitat under various percentages of restored habitat use by smelt. This could be much easier to evaluate by seeing what baseline habitat quantities are, how those quantities change under different operational rules and how they change under different restoration assumptions. Without the first two bases for comparison, conclusions are difficult to evaluate.

The delta smelt habitat calculations are also unclear in that they simply report acreages. Summer habitat is defined differently than fall habitats and it would be useful to examine both. In both seasons, a reporting of acre-days or other calculation that captured both extent and duration of habitat would be useful. Also, a reporting of minimal habitat for each season and each year would be useful as that may well reflect sensitive bottlenecks in the life-cycle of smelt.

Modeled factors

The list of parameters associated with flow seems complete, but the descriptions and some of the modeling approaches do not capture either the full range of aspects of those parameters nor a lot of the understanding that we have of how they work. Some modeling that was described earlier in the effects analysis is not reported here and would be useful in evaluation.

Dissolved oxygen – In the effects analysis, a model approach was proposed to look at residence time of material in the south delta. This would also provide excellent modeling outputs for analysis of the effects of contaminants of a variety of types and growth of slow water species like Microcystis. We could not find these modeling results in this appendix but only a reference to the bubbler for the Stockton Deep Water Ship Channel. The report quotes DWR reports that "the aeration system can be effective at meeting the Basin Plan objectives for dissolved oxygen of 5 mg/L (or 6 mg/L from September through November) as long as the inflowing biochemical oxygen demand (BOD) does not exceed the capacity of the aeration facility to produce oxygen (California Department of Water Resources 2010)." It is imperative, therefore, to assess how the Proposed Project might alter the BOD and residence times of water in the area. Modeling results are needed to help assess whether the aerator would be adequate and whether other areas might suffer reduced DO levels. In light of the large amount of work done on DO, and the likely changes in residence time due to the Proposed Project, the concluding assertion that the Proposed Project will not affect DO because "DO in the Delta [is] affected primarily by atmospheric conditions," is unconvincing.

Salinity is described in relation to fish distributions and to different DO capacities. We are unaware of any evidence that the different DO capacities at different salinities is of consequence in this estuary. But considerable concern exists around salinities at drinking water intakes. Salinity is only addressed as a part of a marine- freshwater gradient, but salts, from the San Joaquin Valley, including but not limited to selenium are of concern. The Proposed Project is likely to have an impact on the loading, fate, and transport of Se into and through the delta. This could be addressed via the 'water fingerprint' modeling that is used for salmon migratory cues.

Temperature - Temperature effects of the project are credibly subsumed into effects of climate change. However, more analysis of the bioenergetic effects, rather than threshold effects would be useful. i.e.,

as temperature goes up, growth rates and food consumption demands increase as well, up to lethal limits. Thus, any negative effects of the Proposed Project on food abundance and distribution will be exacerbated by greater demands for food. The Proposed Project could affect food abundance and distribution through changes in residence time, in-delta flow patterns, through delta flow patterns, etc. We could not find material that would address this issue.

Turbidity – This is an important and difficult topic. The initial discussion on page C.1-3. cites B.J. Miller pers. comm. as the sole authority for decreased turbidity in the delta over the past four decades. This overlooks the four decades of work on this topic begun by Arthur and Ball in the 1970s and continuing through the career of Dave Schoelhamer (USGS) in the present day. As the Appendix notes, no quantitative models of turbidity in the delta are available so reliance is appropriately placed on professional judgment. It would be good to describe whose professional judgments were sought and how they were applied to the issues raised in this appendix. Even without a quantitative model, the factors contributing to the decline in turbidity over the last four decades are fairly well known now and described in a number of scientific publications. Professional judgment could be applied to assess which of these factors are likely to continue, exacerbate or diminish across the coming five decades. Interactions of suspended sediment concentrations would also be important in assessing possible changes in toxicity of some contaminants, particularly pyrethroids.

Confidence of conclusions

The DRERIP models are referenced as the basis for a number of conclusions in this document. One useful aspect of the DRERIP models that could be more directly applied in their use here is the confidence with which drivers are linked to responses. Some processes are known to operate in this estuary, others are presumed from studies elsewhere and some are simply reasonable conjectures. The conclusions in this appendix should reflect the confidence of the relationships they are based on. This would be very easy for those conclusions based upon DRERIP models and could be usefully approximated for other models and their applications. For example, many conclusions are drawn about the project impacts on lamprey – a species for which almost nothing about its biology in the delta is known. Conclusions about how changes in flow and habitat in the delta will affect lamprey, therefore, cannot be given the same level of credence as similar conclusions for striped bass, salmon or smelt. Similarly, conclusions based on unpublished biological models should not be presented with the same level of confidence as the results of calibrated hydrodynamic models. In this draft document, conclusions are presented for all issues of concern and no indication is given as to which are based on more reliable tools. Separating conclusions that can be strongly supported from general discussions from those for which data or models are inadequate for drawing conclusions would greatly increase the transparency and credibility of Appendix C.